

ATOMIC ENERGY

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Dear Sir:

Tritium (hydrogen-3), for the United States' hydrogen, or fusion bomb program, will be produced in nuclear reactors especially constructed for that purpose by E. I. du Pont de Nemours and Company. A prime cost-reimbursement contract has been negotiated with du Pont, by the U. S. Atomic Energy Commission, under which that firm will design, construct, and operate the reactors and associated facilities. Du Pont was builder and first operator of the plutonium production reactors, at Hanford Works. Initial funds for this phase of the work were included in President Truman's July 7th request to Congress for \$260 million in supplemental appropriations for the AEC for fiscal 1951. (See AEN 7/18/50, page 1: "Supplemental appropriation...for nuclear reactors with primary military uses".) Funds appropriated previously for basic research supported the earlier initial studies at Argonne, Los Alamos, and other AEC laboratories which laid the groundwork for this latest production phase. An attempt is now being made to locate a site for the project, which may include some 200,000 acres. Magnitude of the undertaking is shown by the AEC's establishing a new operations office--its ninth--with temporary offices in Washington, D.C. Curtis A. Nelson was named manager, and Robert C. Blair deputy manager, of this new AEC office.

This decision (as above) to erect nuclear reactors specifically for tritium production removes a deterrent to construction of fusion bombs. This obstacle was the lowered production of plutonium which would result if tritium were to be made in the nuclear reactors at Hanford Plutonium Works. Since the nuclear reactors now in operation at Hanford produce neutrons in large quantity, and up to now they have been used solely in the production of plutonium, they could be used just as well to produce quantities of tritium, as tritium is produced in a nuclear reaction in which neutrons are absorbed. Obviously, it would be necessary to forego the production of a certain amount of plutonium, if tritium were to be made in a Hanford reactor. As has been pointed out by Dr. Robert F. Bacher, physicist, and former AEC Commissioner, hydrogen bombs are "not a very good addition" to the military potential of the United States, although its densely populated cities are especially vulnerable to them. There should not, therefore, be any sacrifice of plutonium production capacity for fission bombs, through manufacture of hydrogen bombs.

Devoted 90% to control of radiation hazards, the AEC's recently-issued semi-annual report to Congress includes estimates showing additional construction and operating costs to effect industrial control of such hazards. It estimates that a plant, using non-radioactive processes, which cost \$1 million to construct, would cost \$13 million were the same plant to use radioactive materials. Operating costs, for these plants, with \$747,000.00 annually for the first, would be \$2,067,000.00 for the second. Costly precautions against radiation hazards would account for the increases.

AT THE ATOMIC CITIES & CENTERS IN THE UNITED STATES...

OAK RIDGE, Tennessee- A breakdown of the 14,000 shipments of isotopes which have been sent out from here, since the start of the distribution program at Oak Ridge some 4 years ago, shows that 47% have been used in medical diagnosis and treatment; 25% in medical research; 8% in agricultural research; 4% in industrial studies and applied uses; and 16% in other fundamental scientific studies. Radioactive isotopes have gone to 430 institutions in the United States, while approximately 200 organizations in this country have received concentrated stable isotopes. In addition, 160 institutions, in 27 foreign countries, have been sent radioactive isotopes for investigations in medicine, agriculture, and industry.

A low bid of \$279,928.00, for construction of a new experimental research building at Oak Ridge National Laboratory, was submitted by John A. Johnson & Sons, Inc., Oak Ridge. The building will house a nuclear research project of the Laboratory.

LOS ALAMOS, New Mexico- Outlining disadvantages in changing the form of community government in Los Alamos, Carroll L. Tyler, the AEC's Santa Fe Operations manager, recently told residents here that the community "already has attained most of the objectives of democratic government". He said the community cannot be separated from the scientific laboratories; that the project is, and always will be, the only reason for the town to exist. Tyler said the present set-up (Zia Company operation: AEN 7/18/50, p.2) is efficient and less expensive to the residents than if the town were in private hands. (Meanwhile, at Congress's insistence that the AEC sever itself from community operations, studies have been instigated, and private firms hired by AEC management, to get cost and other data on private ownership at its towns.)

ATOMIC PATENT DIGEST...latest U.S. & British applications & grants...

GREAT BRITAIN- Application filed June 27, 1950, British Patent Office, by Isotope Developments, Ltd., and K. Fearnside, for insecticides. (No. P-16033.)

Application filed June 29, 1950, British Patent Office, by L. Urmenyi, for measurement of nuclear radiations. (No. P-16239.)

UNITED STATES-Regulator amplifier. Comprises a high voltage regulator incorporating a two-stage direct coupled amplifier, having a negative feedback loop. A portion of the load voltage is connected in series with a standard voltage and the combination of these voltages is applied to the input of the first stage of amplification. Application No. 88,814, made to U. S. Patent Office; assigned to United States of America (USAEC).

Scintillation type radiation detector, and coincidence circuit. An electronic apparatus, including a pair of electronic energy responsive devices, several non-linear resistive conductors, a pair of electron amplifiers, and a third electronic energy responsive device. U. S. Pat. No. 2,517,404, issued August 1st, 1950; assigned to Radio Corporation of America, New York.

Method and apparatus for measuring alpha particle radiation. Comprises a gas tight closure which contains a quantity of a gaseous material which will react with alpha particles to provide neutrons. An alpha particle source is supported within the closure, and a body of neutron slowing material is disposed about the closure. This body contains several cavities, located at differing distances from the closure. Neutron detection means are disposed within some of these cavities. U. S. Pat. No. 2,517,469, issued August 1st, 1950; assigned to United States of America (USAEC).

Phosphate glass. A phosphate base glass consisting essentially of at least one oxide of the group consisting of 6 to 67% of molybdenum oxide, and 7 to 84% of tungsten oxide, at least one oxide of the group consisting of 7 to 50% bismuth oxide, and 12 to 70% of lead oxide, 13 to 64% of phosphorous pentoxide, and not more than about 5% total "minor oxides". The resultant glass has a lead equivalent for 100 kv. x-rays greater than 0.33. U. S. Pat. No. 2,518,194, issued August 8, 1950, to A. Silverman, Pittsburgh, Pa.; J. J. Rothmel, Corning, N.Y.; and Kuan-Han Sun, Wilkensburg, Pa. (See p. 3 this LETTER: "Neutron and x-ray shielding properties of newly developed glasses".)

NEW PRODUCTS, PROCESSES & INSTRUMENTS...for nuclear work...

FROM THE MANUFACTURERS'- New series of scalers, Models 1010, 1020, and 1030, for G-M, proportional, scintillation, alpha chamber, and all high resolution counting. Includes basic features, to which it is possible to add optional features for special research. Described as "building block" units, manufacturer states that standardization makes possible a "custom" scaler at quantity production price.--Atomic Instrument Co., Boston 39, Mass.

Pulse generator for test work; Model 1022 is designed for checking, and general test work. Provides pulses, either positive or negative, with a choice of 1, 10, or 100 microseconds width. Maximum pulse amplitude is 20 volts, in three ranges: 0-0.5, 0-5 and 0-20 volts, full scale. On 60-cycle supply, pulse frequency is 60 per second. Manufacturer states accuracy of instrument is within the meter reading accuracy of 5% over the entire range.--Nuclear Instrument & Chemical Corp., Chicago, Ill.

Alpha scintillation probe, Model P-12, is designed for use with commercially available scalers and counting rate meters, for the selective detection and measurement of alpha particles. The phosphor light pulse, generated by alpha bombardment, has a decay time of about ten microseconds, making it possible to count at the maximum rate of most scalers. Manufacturer states that background of this alpha probe is about 5 counts per hour. The probe is said to be almost completely insensitive to beta or gamma radiation, but practically 100% efficient for alpha particles with energies of four or five Mev. Maker states the instrument is completely non-microphonic. Under normal operation its life expectancy is said to be unlimited.--Tracerlab, Inc., Boston, Mass.

Universal scintillation counter which provides, manufacturer states, low background alpha counting and high efficiency beta and gamma counting. Intended for use in counting samples and smears in health physics work, for analytical determination of disintegration rate, and in counting radiation of ore samples. Sampling chamber can accommodate specimens up to two inches in diameter. Designed for use with a standard scaler supplying high voltage; employs an RCA 5819 photomultiplier tube.--General Electric Co., Schenectady 5, N.Y.

RECENT DEVELOPMENTS- A glass, claimed effective as a neutron shielding material, has reportedly been developed by a research team at the University of Pittsburgh. The glass was said to utilize cadmium borosilicate, and certain fluorides. The research team included A. Silverman, J. J. Rothermel, Kuan-Han Sun, H. W. Stafford, and L. Melnick. Another glass developed was said to have x-ray shielding properties greater than glasses previously produced. (See "phosphate glass", patent issued; page 2, this LETTER.)

Radioactivity detectors designed for radioactive mineral prospecting by rapidly moving land vehicles (30 mph), and for aircraft (125 mph) have been developed by McPhar Engineering Co., Toronto, Canada; they have been used for Canadian prospecting. The scintillation type instrument records on tape. When used in an aircraft, the pilot follows a regular flight plan; the aircraft observer continuously plots the track made good (aircraft's ground path), and gives these check points to a technician in the aircraft, as well as elevation, bearing, etc., which is all placed on the tape of the instrument. Thus, ground position and radioactivity level are tied together.

NEWS & NOTES- A symposium on the use of isotopes in petroleum chemistry, two symposia on radioactive waste problems and treatment, and three sessions devoted to the chemistry of the actinide elements, are scheduled for the 118th national meeting of the American Chemical Society, Chicago, Sept. 3-8, this year. Six papers will be presented in the petroleum chemistry symposium with fifteen for the two radioactive waste symposia. Papers on the new element Californium, and the chemistry of Berkelium, and Curium, will make up some of the thirty-three papers comprising the sessions on the chemistry of the actinide elements.

Reed College has incorporated into its recently opened chemistry wing, on its campus in Portland, Oregon, special facilities for radiochemistry studies. Storage for radioactive isotopes was improvised in the early stages of construction. A vault was made under the concrete basement stairway, and a leaden door installed.

BOOKS & OTHER PUBLICATIONS...in the nuclear field...

Liquid Metals Handbook. Editor-in-chief, R. N. Lyon, Oak Ridge National Laboratory. Information gathered during the course of research into heat transfer agents for nuclear chain reactors producing power. Seven chapters: (1)Physical properties of some liquid metals, (2)Chemical properties & laboratory techniques, (3)Resistance of materials to attack by liquid metals, (4)Availability, (5)Heat transfer, (6)Large scale handling, (7)Industrial utilization. The AEC sponsored research was done by the Naval Research Laboratory; Mine Safety Appliance Co.; Argonne National Laboratory; Office of Naval Research; Oak Ridge National Laboratory; Knolls Atomic Power Laboratory; and the University of Michigan. --Superintendent of Documents, Washington 25, D. C. (\$1.25)

The Hydrogen Bomb and International Control: Technical and Background Information. Basic technical data on the production problems, costs, and raw materials for fission and fusion bombs. Ramifications of the problem of international control. --Joint Congressional Committee on Atomic Energy, Capitol Building, Washington 25, D. C. (n/c)

The Development and Future of Nuclear Energy, by Sir John Cockcroft. The Romanes Lecture for 1950, as given by Prof. Cockcroft, who is the Director, Atomic Energy Research Establishment, Harwell (England). --Oxford University Press, Amen House, London, E. C. 4, England. (2s.)

NOTES- Thirty-one American libraries in all parts of the country are to be official depositories for complete sets of non-secret atomic energy research reports. At the present time, approximately 3,500 reports are in a full set; about 1,500 are being issued each year. These depositories are public libraries of Denver, Detroit, New York, Cleveland, and Pittsburgh; The Library of Congress, Washington, D.C.; and various University libraries.

The Document Sales Agency of the AEC, at Oak Ridge, Tenn. has been discontinued. All AEC non-secret research reports, which are available for sale, may now be obtained from: Office of Technical Services, Dep't. of Commerce, Wash. 25, D.C. However, the official distribution of such reports, those not sold and exchange agreements with academic and research institutions, will continue to be handled by the Technical Information Division, Oak Ridge Extension AEC. (The latest list of these reports, number 16, was issued June, 1950, by the Technical Information Division, ORE. It comprised 21 reports in chemistry; 11 in instruments; 39 in physics; 6 in biology and medicine; and 5 in metallurgy and ceramics.)

As mentioned in this LETTER of 7/18/50, page 5, the recent publication, "The Effects of Atomic Weapons" (Superintendent of Documents, Washington 25, D.C., \$1.25) gives basic technical information on atomic explosions. It also outlines for civil defense authorities basic measures that should be taken to protect against such explosions, as well as mechanical and radiation phenomena that might be used by architects and engineers in the design of atomic-bomb-proof structures.

PEOPLE...in the atomic program...

Carroll L. Wilson, AEC general manager, said he lacked confidence in the new Chairman of the AEC--Gordon E. Dean--and has resigned, effective Aug. 15. It is believed that the major factor behind this resignation was a dispute over whether the AEC Commissioners, or the general manager, should really run the AEC. Wilson, who as general manager, was the principal administrative and executive officer of the Commission, had a free hand under Lillienthal. Now, Wilson stated, "There has been a steady trend during the past year in the direction of the Commission as a body assuming the direct role of management of the program....I have serious apprehensions that the ultimate projection of this trend will result in a cumbersome, slow-moving, administrative machine".

Dr. T. K. Glennan, president of Case Institute of Technology, Cleveland, was nominated last week by President Truman as a member of the AEC. If the nomination is confirmed, Dr. Glennan will fill the vacancy on the five-man Commission caused by the resignation of Lewis L. Strauss last February.

RAW MATERIALS...radioactive ores & other essentials for nuclear work...

UNITED STATES- Marysvale, Utah: Vanadium Corp. of America, and Bullion Monarch Mining Co., using open pit power-shovel methods, are uncovering autunite ores in what is essentially a surface operation. With the expectation that primary uranium ore may be at depth, a number of inclined shafts and tunnels to get under the overlying lava have been started...Plumbic Mines Co. is working in five claims immediately adjacent the Vanadium operation. Here, too, an inclined shaft has been started to explore under the lava flow. The nearby Vanadium shaft has cut veinlets said to contain primary uranium ore. Financing for present work is by proceeds from a 200,000 share stock issue recently offered by Plumbic, and which was taken up in short order...Moab, Utah: There are now at least 30 uranium-vanadium operations underway in the Yellowcat district. A great deal of ore is said to be shipped out.

CANADA- Intensive uranium ore activity marks the vicinity of Beaverlodge Lake, on the north shore of Lake Athabaska. Leading operator in the area is the Canadian government-owned Eldorado Mining and Refining, which completed sinking two shafts in April, and now has underway an extensive program of underground development. The other underground operation here is that of Nicholson Mines, Ltd., which has opened high-grade oreshoots on its 100-and 200-foot levels. Encouraging uranium content of its ores has resulted in plans being made for mill installation here. Nesbitt Uranium Mines, Ltd., which holds nine claims adjoining Eldorado's Ato group on the west, between Beaverlodge Lake, and Melville Lake, is conducting diamond drilling on five good showings. Efforts are being made to determine the length and depth persistence of a 1949 discovery of a pitchblende vein here. Eagle Ace Uranium Mines, Ltd., is developing a group of 18 claims located between two of Eldorado's shafts. An important discovery in this area, the Strike group, has previously reported high-grade pitchblende (AEN 7/4/50, p.4). This group comprises four claims on Mickey Lake, about one mile from Eldorado's Ace shaft. Trenching and preliminary work has been carried out here. Pitch-Ore Uranium Mines, Ltd., is doing preliminary exploration work on its 12-claim group, on Beaverlodge Lake. Four pitchblende veins have been reported; diamond drilling is planned for the fall.

PORTUGUESE EAST AFRICA- A uranium boom has hit the colony here of Lourenco Marges, Mozambique, following the discovery of a reef formation near Tete (AEN 4/11/50, p.4) which mining people here have estimated may yield up to 100,000 tons of uranium ore. Portuguese prospectors found the reef, which has been reported to have a strike of 6,000-feet, with an average width of almost 3-feet.

RADIOISOTOPES...as used for tracer & therapy applications...

One hundred and twenty cases of hyperthyroidism were treated with radioactive iodine and followed for 5 to 35 months, at the University of Wisconsin Medical School. E. S. Gordon, M.D., and E. C. Albright, M.D., of the Department of Medicine there, have reported that all of these patients have responded to therapy, and all have returned to euthyroid status, except three who have become hypothyroid, and several patients who recently began, but have not completed therapy. Both nodular and diffuse goiters were treated. No difference was noted in the rate or mode of response, nor was any untoward reaction to radioactive iodine seen. Gordon and Albright consider radioiodine the treatment of choice for toxic goiter, with the exception of goiters during pregnancy, large goiters producing mechanical obstructions, and very large glands involving the danger of malignancy.

Sincerely,

The Staff,
ATOMIC ENERGY NEWSLETTER

August 15th, 1950.